Plant Sociology 59(2) 2022, 71–98 | DOI 10.3897/pls2022592/06

PENSOFT

Società Italiana di Scienza della Vegetazione (SISV)

New national and regional Annex I Habitat records: from #45 to #59

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Subject editor: Daniele Viciani ♦ **Received** 28 November 2022 ♦ **Accepted** 14 December 2022 ♦ **Published** 31 December 2022

Abstract

New Italian data on the distribution of Annex I Habitats are reported in this contribution. Specifically, 8 new occurrences in Natura 2000 sites are presented and 27 new cells are added in the EEA 10 km × 10 km reference grid. The new data refer to the Italian administrative regions of Apulia, Campania, Calabria, Lazio, Tuscany, Umbria, Sardinia, and Sicily.

Keywords

Conservation, vegetation, 1210, 2270*, 3120, 3130, 3150, 3170*, 6420, 6510, 91AA*, 91E0*, 91F0, 92/43/EEC Directive, 9540

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Introduction

In this contribution, we report new distribution data concerning Annex I. We took into account 12 habitats, concerning the Mediterranean biogeographic region. This is the eighth contribution reporting records of new occurrences of Annex I Habitats in Italy. By comparing the 4th Report ex-Art. 17 of Annex I Habitat Monitoring in Europe (Eionet 2019), these cell occurrences are newly recorded for Italy. The phytosociological relevés of each contribution are reported and subsequently archived into the Italian database "VegItaly" (Gigante et al. 2012; Landucci et al. 2012).

Habitats records

Following the standard format of Gigante et al. (2019b), all species data, site data and descriptions of the new habitat records are hereafter provided. We report a summary in Tab. 1, offering an overview of the novelties. For mapping purposes, we used the open source QGIS Geographic information System (QGIS.org 2021) for mapping purposes.

#45. Annex I Habitat: 1210 Annual vegetation of drift lines (Perrino EV, Wagensommer RP)

EUNIS Classification system: B1.12 - Middle European sand beach annual communities
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Euphorbion peplidis* Tx. ex Oberd. 1952, *Thero-Atriplicetalia* Pignatti 1953, *Cakiletea maritimae* Tx. et Preising in Tx. ex Br.-Bl. et Tx. 1952 (Biondi et al. 2009).

Table 1. Synthetic overview of the newly reported data.

Hab ID	Hab name	Cell ID	Country	BR	N2000 Site	Authors
1210	Annual vegetation of drift lines	10kmE493N201	Italy	MED	-	Perrino E.V., Wagensommer R.P.
2270*	Wooded dunes with *Pinus pinea* and/or *Pinus pinaster*	10kmE483N172, 10kmE488N171	Italy	MED	-	Morabito A., Musarella C.M., Spampinato G.
3120	Oligotrophic waters containing very few minerals generally on sandy soils of the West Mediterranean, with *Isoëtes* spp.	10kmE418N193	Italy	MED	-	Rivieccio G., Bagella S., Farris E., Caria M.C.C.
3130	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*	10kmE459N207	Italy	MED	-	Fanfarillo E., Fiaschi T., Angiolini C.
3150	Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation	10kmE459N207	Italy	MED	-	Fanfarillo E., Fiaschi T., Angiolini C.
3170*	Mediterranean temporary ponds	10kmE418N193	Italy	MED	-	Rivieccio G., Bagella S., Farris E., Caria M.C.C.
3170*	Mediterranean temporary ponds	10kmE461N205, 10kmE460N202, 10kmE463N202	Italy	MED	IT6040023	Azzella M.M., Fortini P., Minutillo F., Tondi G., Di Pietro R.
6420	Mediterranean tall humid herb grasslands of the *Molinio-Holoschoenion*	10kmE441N226	Italy	MED	-	Fiaschi T., Cannucci S., Bonari G.
6420	Mediterranean tall humid herb grasslands of the *Molinio-Holoschoenion*	10kmE486N173	Italy	MED	IT9340119	Morabito A., Musarella C.M., Spampinato G.
6510	Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)	10kmE456N217	Italy	MED	IT5210068	Bonini F., Ferri V., Gigante D.
91AA*	Eastern white oak woods	10kmE492N200, 10kmE493N200, 10kmE493N201	Italy	MED	-	Mantino F., Forte L., Tomaselli V.
91E0*	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)	10kmE479N191, 10kmE476N194, 10kmE477N193, 10kmE476N191, 10kmE476N192, 10kmE476N193, 10kmE478N192	Italy	MED	IT8050001, IT8050002, IT8050012, IT8050013	Patera G.
91E0*	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)	10kmE442N227	Italy	MED	-	Mei G., Stinca A., Esposito A.
91F0	Riparian mixed forests of *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior* or *Fraxinus angustifolia*, along the great rivers (*Ulmenion minoris*)	10kmE488N187	Italy	MED	IT9310044	Tavilla G., Laface V.L.A., Spampinato G., Musarella C.M., Crisafulli A., Maiorca G.
9540	Mediterranean pine forests with endemic Mesogean pines	10kmE465N164, 10kmE457N165	Italy	MED	-	Gianguzzi L., Bazan G.

Table 2. Habitat 1210.

Relevé number	1
Cell ID	10km E493N201
Latitude	40.89486
Longitude	17.38039
Date	02/09/21
Area (m^2)	15
Altitude (m a.s.l.)	1
Cover (%)	20
Herb layer height (m)	0.2
Herb layer cover (%)	20
Charact. of *Euphorbion peplidis, Thero-Atriplicetalia, Cakiletea maritimae*	
^*Cakile maritima* Scop. subsp. *maritima*	2
^*Polygonum maritimum* L.	+
^*Soda inermis* Fourr.	+
Other species	
Lagurus ovatus L. subsp. *ovatus*	+
Convolvulus soldanella L.	+
Thinopyrum junceum (L.) Á.Löve	+

^Reference plant species of the Habitat 1210, from Biondi et al. (2009).

Geographic information: Italy, Apulia, Bari, Monopoli, Capitolo, Lido Baia del Sole, 1 m a.s.l., Coordinates: 40.89486 N, 17.38039 E (Tab. 2, Rel. 1).
Cells ID in the EEA reference grid: 10kmE493N201 (Fig. 1).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Tab. 2; nomenclature and taxa delimitation according to Portal to the Flora of Italy (2022).
Notes: In the study area, along the litoral sector from Bari to Capitolo, the rocky coast prevails, and the sandy shorelines are very rare and often compromised by man's actions for tourism purposes (Perrino et al. 2013).

#46. Annex I Habitat: 2270* Wooded dunes with *Pinus pinea* and/or *Pinus pinaster* (Morabito A, Musarella CM, Spampinato G)

EUNIS Classification system: N1G (formerly B1.7): Mediterranean coniferous coastal dune forest (Chytrý et al. 2020)
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Pistacio lentisci-Rhamnetalia alaterni* Rivas Martínez 1975, *Quercetea ilicis* Br.-Bl. in Br.-Bl., Roussine et Nègre 1952 (Biondi and Blasi 2015; Biondi et al. 2009).
Geographic information: Italy, Calabria, Reggio Calabria, Palmi, 7 m a.s.l. Coordinates: 38.406858 N, 15.869278 E (Tab. 3, Rel. 1); Roccella Ionica, Via Marina Porto delle Grazie, 9 m a.s.l. Coordinates 38.327940 N, 16.429254 E (Tab. 3, Rel. 2).
Cells ID in the EEA reference grid: 10kmE483N172 (Tab. 3, Rel. 1), 10kmE488N171 (Tab. 3, Rel. 2) (Fig. 2).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Tab. 3; nomenclature and taxa delimitation according to Portal to the Flora of Italy (2022).

Figure 1. Distribution in Italy of Habitat 1210: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019).

Table 3. Habitat 2270*.

Relevé number	1	2	
Cell ID	10kmE483N172	10kmE488N171	
Latitude	38.406858	38.327940	
Longitude	15.869278	16.429254	
Date	27/03/22	03/05/22	
Area (m²)	100	100	
Altitude (m a.s.l.)	5	5	
Cover (%)	100	100	
Tree layer height (m)	12	10	
Shrub layer height (m)	-	-	
Herb layer height (m)	0.4	0.4	
Tree layer cover (%)	80	95	
Shrub layer cover (%)	-	-	
Herb layer cover (%)	10	5	Presences
Charact. taxa of *Pistacio- Rhamnetalia alaterni, Quercetea ilicis*			
^*Pinus pinea* L.	4	5	2
^*Asparagus albus* L.	1	.	1
Other species			
Lagurus ovatus L. subsp. *ovatus*	+	+	2
Allium triquetrum L.	1	.	1
Carduus pycnocephalus L.	+	.	1
Cynodon dactylon (L.) Pers.	1	.	1
Daucus carota L.	+	.	1
Fumaria bastardii Boreau	+	.	1
Hordeum murinum L.	.	+	1
Lolium rigidum Gaudin	.	+	1
Chenopodium album L.	.	+	1
Plantago lagopus L.	.	+	1
Sonchus bulbosus (L.) N.Kilian & Greuter subsp. *bulbosus*	+	.	1
Stellaria media (L.) Vill.	+	.	1
Urtica membranacea Poir.	+	.	1
Vicia dasycarpa Ten.	+	.	1

^Reference plant species of the Habitat 2270*, from Biondi et al. (2009).

Notes: The habitat has been identified on the Tyrrhenian coast of Calabria near Palmi and on the Ionian coast near Roccella Ionica (RC). In both locations, the habitat extends a long stretch of the shoreline. These are communities planted on the inland dune system about seventy years ago. They consist exclusively of *Pinus halepensis* and *Pinus pinea*, currently in a precarious state of conservation due to the high density of the planting. This prevents the regeneration of pine trees and the establishment of woody species typical of the Mediterranean maquis.

#47. Annex I Habitat: 3120 Oligotrophic waters containing very few minerals generally on sandy soils of the West Mediterranean, with *Isoëtes* spp. (Rivieccio G, Bagella S, Farris E, Caria MC)

EUNIS Classification system: C3.4 - Species-poor beds of low-growing water-fringing or amphibious vegetation
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Apienion crassipedis* Bagella, Caria, Farris et Filigheddu 2009; *Preslion cervinae* Br.-Bl. ex Moor 1937; *Isoëtetalia* Br.-Bl. 1936; *Isoëto-Nanojuncetea* Br.-Bl. et Tüxen ex Westhoff, Dijk et Passchier 1946 (Bagella et al. 2009; Mucina et al. 2016).
Geographic information: Precise coordinates are not available, relevés were done in the surrounding of the specified coordinates. Italy, Sardinia, Sassari, Alghero, La Scaletta 232 m a.s.l. Coordinates: 40.533478 N, 8.369431 E (Tab. 4, Rels 1 to 4); Italy, Sardinia, Sassari, Alghero, Scala

Figure 2. Distribution in Italy of Habitat 2270*: in black the new cells, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019).

Piccada 309 m a.s.l. Coordinates: 40.528142 N, 8.375761 E (Tab. 4, Rels 5 to 7).

Cells ID in the EEA reference grid: 10kmE418N193 (Fig. 3).

Natura 2000 Site Code: currently not included in any Natura 2000 Site.

Phytosociological table: Tab. 4; nomenclature and taxa delimitation according to Portal to the Flora of Italy (2022).

Table 4. Habitat 3120.

Relevé number	1	2	3	4	5	6	7	
Cell ID	10km E418N193	10km E418N193	10km E418N193	10km E418N193	10km E418N193	10km E418N193	10km E418N193	
Latitude	40.533478	40.533478	40.533478	40.533478	40.528142	40.528142	40.528142	
Longitude	8.369431	8.369431	8.369431	8.369431	8.375761	8.375761	8.375761	
Date	19/03/10	19/03/10	19/03/10	19/03/10	19/03/10	19/03/10	19/03/10	
Area (m²)	8	6	4	1	6	4	8	
Altitude (m a.s.l.)	72	72	72	72	309	309	309	
Cover (%)	90	80	100	80	80	90	90	Presences
Charact. and diff. taxa of *Preslion cervinae, Isoëtetalia, Isoëto-Nanojuncetea*								
^*Isoëtes tiguliana* Gennari	4	3	2	3	3	1	3	7
Lythrum hyssopifolia L.	+	+	1	+	1	+	+	7
^*Middendorfia borysthenica* (Schrank) Trautv.	+	+	2	2	.	1	.	5
Juncus bufonius L.	.	.	+	+	+	.		3
Eudianthe laeta (Aiton) Fenzl	.	.	+	.	.	.	r	2
Lotus hispidus DC.	.	.	.	.	r	r	.	2
Bulliarda vaillantii (Willd.) DC.	.	.	.	.	1	.	.	1
Juncus pygmaeus Richard	.	.	.	.	+	.	.	1
Ranunculus cordiger Viv.	r	.	.	.	.	.	.	1
Charact. and diff. taxa of *Ranunculion aquatilis, Potametalia, Potametea*								
Callitriche stagnalis Scop.	4	3	1	2	2	2	4	7
Ranunculus baudotii Godr.	1	+	.	.	.	.	.	2
Other species								
Chamaemelum fuscatum (Brot.) Vasc.	+	+	1	+	2	r	1	7
Glyceria spicata Guss.	3	1	3	2	1	4	3	7
Eleocharis palustris (L) Roem. & Schult.	1	+	.	+				3
Bellis annua L.	.	.	.	r	+	.	+	3
Linum usitatissimum L. subsp. *angustifolium* (Huds.) Thell.	+	.	+	.			+	3
Ranunculus sardous Crantz.	.	+	+	.	.	.	.	2
Poa infirma Kunth	.	.	.	.	+	.	.	1

^ Reference plant species of the Habitat 3120, from Biondi et al. (2009).

Figure 3. Distribution in Italy of Habitat 3120: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019), in white (black outline) the cells later reported (Rivieccio et al. 2020).

Notes: The alliance *Preslion cervinae* is represented in Sardinia by communities referred to as the Tyrrhenian endemic sub-alliance *Apienion crassipedis* (Bagella et al. 2009). These communities represent a transition between the aquatic and amphibious vegetation and are rich in species of the *Potametea* class.

#48. Annex I Habitat: 3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea* (Fanfarillo E, Fiaschi T, Angiolini C)

EUNIS Classification system: C3.5 - Periodically inundated shores with pioneer and ephemeral vegetation
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Cyperetum micheliani* Horvatić 1931; *Nanocyperion* Koch 1926; *Nanocyperetalia* Klika 1935; *Isoëto-Nanojuncetea* Br.-Bl. et Tx. in Br.-Bl. et al. 1952 (Mucina et al. 2016).
Geographic information: Italy, Lazio, Frosinone, Fumone, 547 m a.s.l., Coordinates: 41.747734 N, 13.258396 E (Tab. 5, Rel. 1); 41.747621 N, 13.258405 E (Tab. 5, Rel. 2); 41.747495 N, 13.258408 E (Tab. 5, Rel. 3).
Cells ID in the EEA reference grid: 10kmE459N207 (Fig. 4).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Tab. 5; nomenclature and taxa delimitation according to Portal to the Flora of Italy (2022).
Notes: Noteworthy is the co-occurrence of several species being very rare in the Latium region, such as *Cyperus michelianus*, *Potentilla supina* and *Sporobolus alopecuroides* (Fig. 5) (Anzalone et al. 2010). Even the absence of alien species suggests a high conservation value of the habitat. A light grazing activity by sheep was observed. The records are included in the Canterno Lake Natural Reserve.

#49. Annex I Habitat: 3150 Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation (Fanfarillo E, Fiaschi T, Angiolini C)

EUNIS Classification system: C1.3 - Permanent eutrophic lakes, ponds and pools
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Polygonetum natantis* Soó 1927 (Fig. 7a); *Potametum pusilli* Soó 1927 (Fig. 7b); *Nymphaeion albae* Oberd. 1957; *Potamogetonion* Libbert 1931; *Potamogetonetalia* Koch 1926; *Potamogetonetea* Klika in Klika et Novák 1941 (Mucina et al. 2016).
Geographic information: Italy, Lazio, Frosinone, Fumone, 547 m a.s.l., Coordinates: 41.746165 N, 13.256657 E (Tab. 6, Rel. 1); 41.746411 N, 13.256578 E (Tab. 6, Rel. 2); 41.746261 N, 13.256659 E (Tab. 6, Rel. 3); 41.746212 N,

Table 5. Habitat 3130.

Relevé number	1	2	3	
Cell ID	10kmE459N207	10kmE459N207	10kmE459N207	
Latitude	41.747734	41.747621	41.747495	
Longitude	13.258396	13.258405	13.258408	
Date	11/08/22	11/08/22	11/08/22	
Area (m^2)	1.5	1.5	2	
Altitude (m a.s.l.)	547	547	547	
Aspect (°)	-	-	-	Presences
Slope (°)	0	0	0	
Water depth cm	-	-	-	
Cover %	85	90	95	
Cyperetum micheliani				
^*Cyperus michelianus* (L.) Delile	4	5	4	3
Charact. and diff. taxa of *Nanocyperion*, *Nanocyperetalia*, *Isoëto-Nanojuncetea*				
Potentilla supina L. subsp. *supina*	2	1	1	3
^*Gnaphalium uliginosum* L.	1	+	2	3
Sporobolus alopecuroides (Piller & Mitterp.) P.M.Peterson	.	.	3	1
Other species				
Medicago arabica (L.) Huds.	2	2	1	3
Rorippa sylvestris (L.) Besser subsp. *sylvestris*	1	1	+	3
Amaranthus blitum L. subsp. *blitum*	1	1	1	3
Verbena officinalis L.	1	+	1	3
Trifolium resupinatum L.	+	2	2	3
Bidens tripartita L.	+	.	1	2
Portulaca oleracea L.	+	+	.	2
Xanthium strumarium L.	.	.	+	1
Convolvulus arvensis L.	.	.	+	1
Persicaria lapathifolia (L.) Delarbre subsp. *lapathifolia*	.	.	+	1

^ Reference plant species of the Habitat 3130, from Biondi et al. (2009).

13.256613 E (Tab. 6, Rel. 4); 41.749555 N, 13.258047 E (Tab. 6, Rel. 5); 41.749620 N, 13.257996 E (Tab. 6, Rel. 6); 41.749930 N, 13.256355 E (Tab. 6, Rel. 7).
C***ells ID in the EEA reference grid***: 10kmE459N207 (Fig. 6)
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Tab. 6; nomenclature and taxa delimitation according to Portal to the Flora of Italy (2022).
Notes: The records are included in the Canterno Lake Natural Reserve.

#50. Annex I Habitat: 3170* Mediterranean Temporary Ponds (Rivieccio G, Bagella S, Farris E, Caria MC)

EUNIS Classification system: C3.4 Species-poor beds of low-growing water-fringing or amphibious vegetation.
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Romuleo requieni-Isoëtetum histricis* Bagella, Caria, Farris et Filigheddu 2009, *Isoëtion* Br.-Bl. 1935, *Isoëtetalia* Br.-Bl. 1935, *Isoëto-Nanojuncetea* Br.-Bl. et Tx. in Br.-Bl. et al. 1952 (Bagella et al. 2009; Mucina et al. 2016).
Geographic information: Precise coordinates are not available, relevés were done in the surrounding of the specified coordinates. Italy, Sardinia, Sassari, Alghero, Valverde 72 m a.s.l Coordinates: 40.548869 N, 8.370372 E (Tab. 7, Rels 1 to 7); Italy, Sardinia, Sassari, Alghero, Scala Piccada 309 m a.s.l Coordinates: 40.528142 N, 8.375761 E (Tab. 7, Rels 8 and 9).
Cells ID in the EEA reference grid: 10kmE418N193 (Fig. 8).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Tab. 7; nomenclature and taxa delimitation according to Portal to the Flora of Italy (2022).
Notes: The dwarf vegetation referred to the association *Romuleo requieni-Isoëtetum histricis* is one of the richest in specialized species among those described for Mediterranean temporary ponds and then considered of priority interest for conservation (Bagella and Caria 2013; Bagella and Podani 2017).

#51. Annex I Habitat: 3170* Mediterranean Temporary Ponds (Azzella MM, Fortini P, Minutillo F, Tondi G, Di Pietro R)

EUNIS Classification system: C3.4 Species-poor beds of low-growing water-fringing or amphibious vegetation.
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Cicendion* (Rivas Goday in Rivas Goday et Borja 1961) Br.-Bl. 1967, *Preslion cervinae* Br.-Bl. ex Moor 1936, *Isoetion durieui* Br-Bl. 1936, *Isoetetalia* Br.-Bl. 1935, *Isoeto-Nanojuncetea* Br.-Bl. et Tx. in Br.-Bl. et al. 1952 (Mucina et al. 2016).

Figure 4. Distribution in Italy of Habitat 3130: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019).

Figure 5. Aspect of Habitat 3130 in the reported stands (Canterno Lake, Fumone, Frosinone, Italy).

Geographic information: Italy, Lazio, Salto di Fondi, Via Covino, 138 m a.s.l., Coordinates: 41.312907 N, 13.334305 E (Tab. 8, Rel. 2); Italy, Lazio, Media Valle Latina, Ceprano, Bosco di Via Sfratti, 2 m a.s.l., Coordinates: 41.553443 N, 13.469985 E (Tab. 8, Rel. 1); Italy, Lazio, Riviera d'Ulisse Regional Park, footslopes of the Gianola-Scauri promontory, 30 m a.s.l., Coordinates: 41.250607 N, 13.679838 E (Tab. 8, Rel. 3).

Cells ID in the EEA reference grid: 10kmE460N202 (Tab. 8, Rel. 1), 10kmE461N205 (Tab. 8, Rel. 2), 10kmE463N202 (Tab. 8, Rel. 3) (Fig. 8).
Natura 2000 Site Code: currently not included in any Natura 2000 Site (Rels. 1 and 2 in Tab. 8), SAC IT6040023 "Promontorio Gianola e Monte di Scauri" (Tab. 8, Rel. 3).
Phytosociological table: Tab. 8; nomenclature and taxa delimitation according to Portal to the Flora of Italy (2022).
Notes: Temporary ponds are ephemeral habitats that are difficult to identify and often developed on patches of few square meters size. The new reports here described regard a large area of the southern Lazio completely devoid of data to date. Two of them refer to areas not included in the Natura 2000 network. The first area (Ceprano) refers to a *Quercus cerris* L. and *Q. frainetto* Ten. coppiced forest where the cutting operations could irreparably damage the integrity and functionality of the temporary pools occurring there (Fig. 9). The second area is located in the surrounding of Lake Fondi, outside the Special Protection Area "SPA IT6040010 – Lago di Fondi", in a pasture partially mixed with Erica arborea L. stands. This area is currently managed by the Fondi municipality for which an urban development is planned, fortunately not yet achieved. The third area is located in rocky temporary pools in a spatial mosaic composed also of *Quercus pubescens* Willd. subsp. *pubescens* and *Q. suber* L. woods, Mediterranean maquis stands dominated by *Erica multiflora* L., *Cytisus laniger* DC. and *Ampelodesmos mauritanicus* (Poir.) T.Durand & Schinz, and steppe-like grasslands with *Hyparrhenia hirta* (L.) Stapf subsp. *hirta* and *Xiphion xiphium* (L.) M.B.Crespo, Mart.Azorín & Mavrodie (Fig. 10). Although this third site is included in a protected area within the Natura 2000 network (IT6040023 – Promonto-

Figure 6. Distribution in Italy of Habitat 3150: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019), in white (black outline) the cells later reported (Tavilla et al. 2022).

Table 6. Habitat 3150.

Relevé number	1	2	3	4	5	6	7	
Cell ID	10km E459N207	10km E459N207	10km E459N207	10km E459N207	10km E459N207	10km E459N207	10km E459N207	
Latitude	41.746165	41.746411	41.746261	41.746212	41.749555	41.749620	41.749930	
Longitude	13.256657	13.256578	13.256659	13.256613	13.258047	13.257996	13.256355	
Date	11/08/22	11/08/22	11/08/22	11/08/22	11/08/22	11/08/22	11/08/22	
Area (m^2)	3	1.5	2	1.5	1	3	2	
Altitude (m a.s.l.)	547	547	547	547	547	547	547	
Aspect (°)	-	-	-	-	-	-	-	
Slope (°)	0	0	0	0	0	0	0	
Water column height (cm)	50	150	100	60	10	30	20	
Cover %	80	80	100	100	90	100	80	Presences
Polygonetum natantis, Nymphaeion albae								
^*Persicaria amphibia* (L.) Delarbre (aquatic form)	5	4	.	+	.	+	1	5
Potametum pusilli								
^*Potamogeton pusillus* L.	3	1	5	5	5	5	4	7
Potamogetonion, Potamogetonetalia, Potamogetonetea								
Potamogeton crispus L.	.	.	1	1	2	1	.	4

^ Reference plant species of the Habitat 3150, from Biondi et al. (2009).

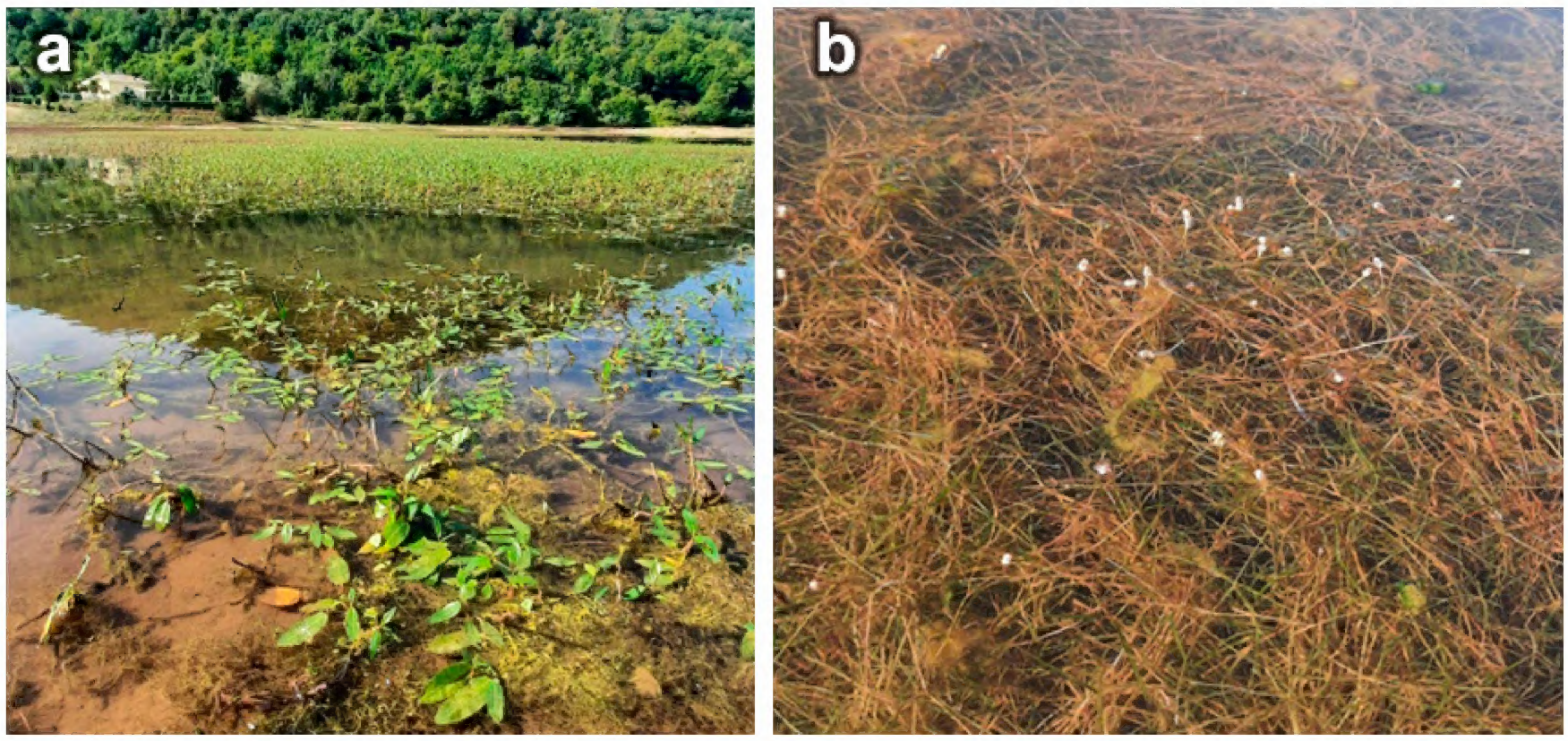

Figure 7. Habitat 3150 in the reported stands (Canterno Lake, Fumone, Frosinone, Italy); a - *Polygonetum natantis*; b - *Potametum pusilli*.

Table 7. Habitat 3170*.

Relevé number	1	2	3	4	5	6	7	8	9	
Cell ID	10km E418N193	10km E418N193	10km E418N193	10km E418N193	10km E418N193	10km E418N193	10km E418N193	10km E418N193	10km E418N193	
Latitude	40.548869	40.548869	40.548869	40.548869	40.548869	40.548869	40.548869	40.528142	40.528142	
Longitude	8.370372	8.370372	8.370372	8.370372	8.370372	8.370372	8.370372	8.375761	8.375761	
Date	19/03/10	19/03/10	19/03/10	19/03/10	19/03/10	19/03/10	19/03/10	19/03/10	19/03/10	
Area (m^2)	2	2	1	6	8	10	0,5	3	2	
Altitude (m a.s.l.)	72	72	72	72	72	72	72	309	309	
Cover (%)	80	65	75	70	70	60	50	50	90	Presences
Charact. and diff. taxa of *Romuleo requieni-Isoëtetum histricis*										
^*Isoetes histrix* Bory	4	3	4	3	2	4	2	1	3	9
^*Romulea requienii* Parl.	1	1	+	+	+	+	.	+	1	8
Charact. and diff. taxa of *Isoëtion, Isoëtetalia, Isoëto-Nanojuncetea*										
^*Lythrum hyssopifolia* L.	1	1	+	1	+	1	2	+	+	9
^*Juncus bufonius* L.	1	+	r	1	+	1	1	1	+	9
Lotus hispidus DC.	+	1	+	+	+	+	+	+	+	9
Ophioglossum lusitanicum L.	1	+	1	+	1	+	.	r	r	8
Bulliarda vaillantii (Willd.) DC.	.	r	r	.	+	+	.	+	.	5
^*Cicendia filiformis* (L.) Delarbre	.	.	r	.	.	.	+	.	r	3

Table 7. Continuation.

Relevé number	1	2	3	4	5	6	7	8	9	
Cell ID	10km E418N193	10km E418N193	10km E418N193	10km E418N193	10km E418N193	10km E418N193	10km E418N193	10km E418N193	10km E418N193	
Latitude	40.548869	40.548869	40.548869	40.548869	40.548869	40.548869	40.548869	40.528142	40.528142	
Longitude	8.370372	8.370372	8.370372	8.370372	8.370372	8.370372	8.370372	8.375761	8.375761	
Date	19/03/10	19/03/10	19/03/10	19/03/10	19/03/10	19/03/10	19/03/10	19/03/10	19/03/10	
Area (m^2)	2	2	1	6	8	10	0,5	3	2	
Altitude (m a.s.l.)	72	72	72	72	72	72	72	309	309	
Cover (%)	80	65	75	70	70	60	50	50	90	Presences
^*Agrostis pourretii* Willd.	1	+	+	.	.	.	.	.	.	3
^*Juncus pygmaeus* Richard	.	+	.	.	.	+	+	.	.	2
Juncus capitatus Weigel.	.	.	.	.	.	.	.	.	r	1
Other species										
Bellis annua L.	3	1	.	r	2	+	+	+	+	8
Linum usitatissimum L. subsp. *angustifolium* (Huds.) Thell.	+	+	+	+	.	r	+	r	r	8
Chamaemelum fuscatum (Brot.) Vasc.	2	+	.	+	3	2	+	2	.	7
Anthoxanthum aristatum Boiss	+	.	+	.	+	+	+	.	+	6
Lysimachia foemina (Mill.) U.Manns & Anderb.	+	.	1	+	.	.	+	+	+	6
Trifolium subterraneum L.	.	.	r	.	+	+	.	+	.	4
Tuberaria lignosa (Sweet) Samp.	r	.	.	.	+	.	.	r	.	3
Plantago coronopus L.	.	.	.	.	2	+	.	+	.	3
Logfia gallica (L.) Cosson & Germ.	.	.	+	.	.	.	.	.	r	2
Callitriche stagnalis Scop.	.	.	.	.	r	.	.	.	.	1
Carex flacca Schreb. subsp. *erythrostachys* (Hoppe) Holub	.	.	.	1	.	.	.	.	.	1
Parentucellia latifolia (L.) Caruel	.	.	.	.	.	.	+	.	.	1
Poa infirma Kunth	.	.	.	.	+	.	.	+	.	1
Sagina apetala Ard. subsp. *apetala*	.	.	.	.	.	.	.	r	.	1
Spergula arvensis L.	.	.	.	.	.	r	.	.	.	1

^ Reference plant species of the Habitat 3170*, from Biondi et al. (2009).

Figure 8. Distribution in Italy of Habitat 3170*: in black the new cells, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019), in white (black outline) the cells later reported (Gigante et al. 2019b; Bazan et al. 2021; Tavilla et al. 2022).

rio Gianola e Monte di Scauri) and belongs to a Regional natural Park (Parco Regionale Riviera d'Ulisse), the presence of the 3170 had never been identified for this area and it is not reported in the Standard Form as well. A recent field survey has revealed that many temporary ponds were damaged by the activities of hyper-abundant wild boars (*Sus scrofa*), which use them for mud baths.

#52. Annex I Habitat: 6420 Mediterranean tall humid herb grasslands of the *Molinio-Holoschoenion* (Fiaschi T, Cannucci S, Bonari G)

EUNIS Classification system: included in R31 – Mediterranean tall humid inland grassland (Chytrý et al. 2020).

Table 8. Habitat 3170*.

Relevé number	1	2	3	
Cell ID	10kmE460N202	10kmE461N205	10kmE463N202	
Latitude	41.553443	41.312907	41.250607	
Longitude	13.469985	13.334305	13.679838	
Date	02/05/22	19/03/22	03/05/09	
Area (m^2)	6	20	4	
Altitude (m a.s.l.)	2	138	30	
Exposition	-	-	-	Presences
Slope (°)	0	0	0	
Cover (%)	90	70	90	
Average vegetation height (cm)	5	10	10	
Cicendion				
^*Lysimachia nardii* Arrigoni	+	.	.	1
Eudianthe laeta Rchb. ex Willk.	+	.	.	1
^*Cicendia filiformis* (L.) Delarbre	+	.	.	1
Preslion cervinae				
Callitriche brutia Petagna	.	2	.	1
Ranunculus ophioglossifolius Vill.	.	1	.	1
Isoetion durieui				
Aira elegantissima Schur subsp. *elegantissima*	1	.	.	1
^*Isoëtes histrix* Bory	3	.	.	1
^*Isoëtes durieui* Bory	1	1	1	3
Isoetetalia				
^*Isolepis cernua* (Vahl) Roem. & Schult.	+	.	1	2
Briza minor L.	1	.	.	1
^*Isoëtes longissima* Bory	.	2	.	1
^*Centaurium maritimum* (L.) Fritsch	.	.	1	1
^*Solenopsis laurentia* (L.) C.Presl	.	.	1	1
Isoeto-Nanojuncetea				
^*Juncus bufonius* L.	+	.	1	2
^*Juncus capitatus* Weigel	1	.	+	2
Juncus hybridus Brot.	+	.		1
^*Juncus pygmaeus* Rich. ex Thuill.	.	.	1	1
Molinio-Arrhenatheretea				
Agrostis canina L. subsp. *canina*	.	3	.	1
Galium debile Desv.	.	1	.	1
Juncus conglomeratus L.	.	1	.	1
Juncus inflexus L. subsp. *inflexus*	.	1	.	1
Oenanthe fistulosa L.	.	1	.	1
Other species				
Carex flacca Schreb. subsp. *flacca*	+	.	1	2
^*Serapias lingua* L.	2	.	1	2
Anacamptis laxiflora (Lam.) R.M.Bateman, Pridgeon & M.W.Chase	1	.	.	1
Coleostephus myconis (L.) Cass. ex Rchb.f.	1	.	.	1
Linum usitatissimum L. subsp. *angustifolium* (Huds.) Thell.	1	.	+	2
Callitriche palustris L.	.	1	.	1
Glyceria notata Chevall.	.	1	.	1
Gratiola officinalis L.	.	2	.	1
Juncus articulatus L. subsp. *articulates*	.	2	.	1
^*Riccia fluitans* L.	.	+	.	1
Lysimachia arvensis (L.) U.Manns & Anderb.	.	.	+	1
Ranunculus paludosus Poir.	.	.	+	1
Oenanthe pimpinelloides L.	.	.	1	1
Xiphion xiphium (L.) M.B.Crespo, Mart.Azorín & Mav.	.	.	3	1
Romulea columnae Sebast. & Mauri	.	.	+	1
Scorpiurus muricatus L.	.	.	+	1

^ Reference plant species of the Habitat 3170*, from Biondi et al. (2009).

Figure 9. Habitat 3170* in the *Quercus cerris* and *Q. frainetto* coppiced forest near Ceprano, Media Valle (Latina, Lazio, Italy).

Figure 10. Habitat 3170* in the Riviera d'Ulisse Regional Park, at the footslope of the Gianola promontory (Lazio, Italy). The community of *Isoeto-Nanojuncetea* also hosts *Xiphion xiphium*.

Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Molinio-Holoschoenion* Br.-Bl. ex Tchou 1948; *Holoschoenetalia* Br.-Bl. ex Tchou 1948; *Molinio-Arrhenatheretea* Tx. 1937 (Mucina et al. 2016).
Geographic information: Italy, Tuscany, Siena, San Gimignano, Cusona, 76 m a.s.l., Coordinates: 43.499812 N, 11.108023 E (Tab. 9, Rel. 1); 43.500042 N, 11.107916 E (Tab. 9, Rel. 2); Italy, Tuscany, Siena, Poggibonsi, 76 m a.s.l., Coordinates: 43.495498 N, 11.112934 E (Tab. 9, Rel. 3); 43.495080 N, 11.113151 E (Tab. 9, Rel. 4).
Cells ID in the EEA reference grid: 10kmE441N226 (Fig. 11).
Nature 2000 Site Code: currently not included in any Natura 2000 site.
Phytosociological table: Tab. 9; nomenclature and taxa delimitation according to Portal to the Flora of Italy (2022).
Notes: Mediterranean tall humid inland grasslands of the alliance *Molinio-Holoschoenion* occur in Continental and Mediterranean Italy (Preislerová et al. 2022). They are common in central Italy and Tuscany (Landi et al. 2002; Landi and Angiolini 2006; Lastrucci et al. 2017). Our data confirm this occurrence but contribute to filling a gap about the presence of the habitat in an inner Italian Peninsular area. Our relevés were recorded in tall grass-dominated vegetation of seasonally waterlogged soils along the river Elsa.

#53. Annex I Habitat: 6420 Mediterranean tall humid herb grasslands of the Molinio-Holoschoenion (Morabito A, Musarella CM, Spampinato G)

EUNIS Classification system: R31 (formerly E3.1) Mediterranean tall humid inland grassland (Chytrý et al. 2020)
Biogeographical Region: Mediterranea
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Dactylorhizo-Juncetum effusi* Brullo et Grillo 1978, *Dactylorhizo-Juncion striati* Brullo et Grillo 1978, *Holoschoenetalia vulgaris* Br.-Bl. ex Tchou

Table 9. Habitat 6420.

Relevé number	1	2	3	4	
Cell ID	10kmE441N226	10kmE441N226	10kmE441N226	10kmE441N226	
Latitude	43.499812	43.500042	43.495498	43.495080	
Longitude	11.108023	11.107916	11.112934	11.113151	
Date	18/08/22	18/08/22	18/08/22	18/08/22	
Area (m^2)	25	25	25	25	
Altitude (m a.s.l.)	76	76	76	76	
Cover (%)	95	100	85	90	Presences
Aspect (°)	-	-	270	300	
Slope (°)	0	0	5	10	
Molinio-Holoschoenion, Holoschoenetalia, Molinio-Arrhenatheretea					
^*Agrostis stolonifera* L. subsp. *stolonifera*	1	2	3	+	4
^*Scirpoides holoschoenus* (L.) Soják	2	3	.	+	3
^*Eupatorium cannabinum* L. subsp. *cannabinum*	2	+	.	3	3
^*Prunella vulgaris* L. subsp. *vulgaris*	+	.	1	+	3
^*Pulicaria dysenterica* (L.) Bernh.	1	.	1	2	3
Ranunculus repens L.	+	+	.	1	3
Lythrum salicaria L.	2	.	1	.	2
^*Cyperus longus* L.	1	2	.	.	2
Jacobaea erratica (Bertol.) Fourr.	.	.	1	1	2
Paspalum distichum L.	+	.	1	.	2
Bidens frondosa L.	.	+	+	.	2
^*Hypericum tetrapterum* Fr.	.	+	.	+	2
Galega officinalis L.	1	.	.	.	1
Barbarea vulgaris W.T. Aiton	.	+	.	.	1
Carex hirta L.	.	.	.	+	1
Plantago major L.	.	+	.	.	1
^*Trifolium resupinatum* L.	.	.	1	.	1
Other species					
Calamagrostis epigejos (L.) Roth subsp. *epigejos*	.	3	2	2	3
Mentha aquatica L. subsp. *aquatica*	1	.	+	1	3
Veronica anagallis-aquatica L. subsp. *anagallis-aquatica*	+	+	+	.	3
Artemisia verlotiorum Lamotte	.	+	.	1	2
Cyperus fuscus L.	+	.	.	1	2
Dittrichia viscosa (L.) Greuter subsp. *viscosa*	2	.	2	.	2
Echinochloa crus-galli (L.) P.Beauv.	1	.	.	1	2
Equisetum telmateja Ehrh.	+	.	1	.	2
Glyceria notata Chevall.	+	+	.	.	2
Juncus bufonius L.	+	+	.	.	2
Lolium arundinaceum (Schreb.) Darbysh.	3	1	.	.	2
Persicaria lapathifolia (L.) Delarbre subsp. *lapathifolia*	.	1	.	+	2
Persicaria maculosa Gray	.	1	.	+	2
Rumex conglomeratus Murray	+	.	.	+	2
Salix purpurea L. subsp. *purpurea*	.	+	.	1	2
Schoenoplectus tabernaemontani (C.C.Gmel.) Palla	.	+	1	.	2
Aegopodium podagraria L.	.	.	.	+	1
Althaea cannabina L.	.	.	.	1	1
Helosciadium nodiflorum (L.) W.D.J.Koch subsp. *nodiflorum*	.	.	.	+	1
Arctium lappa L.	1	.	.	.	1
Atriplex patula L.	+	.	.	.	1
Convolvulus sepium L.	.	1	.	.	1
Carex pendula Huds.	1	.	.		1
Centaurium pulchellum (Sw.) Druce subsp. *pulchellum*	.	.	.	+	1
Epilobium hirsutum L.	.	.	.	1	1
Erigeron canadensis L.	.	.	.	+	1
Euphorbia maculata L.	.	.	+	.	1
Galium aparine L.	.	.	+	.	1
Helianthus tuberosus L.	.	.	.	+	1
Holcus mollis L. subsp. *mollis*	.	.	+	.	1
Lycopus europaeus L.	.	+	.	.	1
Lysimachia arvensis (L.) U.Manns & Anderb.	.	.	.	1	1
Nasturtium officinale W.T.Aiton	+	.	.	.	1
Helminthotheca echioides (L.) Holub	.		+	.	1
Poa sylvicola Guss.	.	+	.	.	1
Polygonum aviculare L. subsp. *aviculare*	.	.	1	+	1
Populus nigra L. subsp. *nigra*	.	.	+	.	1
Samolus valerandi L.	.	.	+	.	1
Saponaria officinalis L.	.	1	.	.	1
Scrophularia auriculata L. subsp. *auriculata*	.	+	.	.	1
Silene latifolia Poir.	.	.	.	+	1
Sonchus asper (L.) Hill	.	.	.	+	1
Succisa pratensis Moench	.	1	.	.	1
Xanthium orientale L.	.	.	.	+	1

^ Reference plant species of the Habitat 6420, from Biondi et al. (2009).

1948, *Molinio-Arrhenatheretea* Tüxen 1937 (Brullo and Spampinato 1999, Biondi and Blasi 2015).
Geographic information: Italy, Calabria, Vibo Valentia, Arena, Arruggiato, 1148 m a.s.l., Coordinates: 38.510383 N, 16.258294 E (Tab. 10, Rel. 1); 1142 m a.s.l., Coordinates: 38.511694 N, 16.258992 E (Tab. 10, Rel. 2); 1146 m a.s.l., Coordinates: 38.510861 N, 16.258442 E (Tab. 10, Rel. 3).
Cells ID in the EEA reference grid: 10kmE486N173 (Fig. 11).
Natura 2000 Site Code: ZSC IT9340119 "Marchesale"
Phytosociological table: Tab. 10; nomenclature and taxa delimitation according to Portal to the Flora of Italy (2022).
Notes: The habitat was identified on the Serre (southern part of Calabrian Apennines) above Arena (VV), located in humid depressions within *Fagus sylvatica* L. forest formations. The association *Dactylorhizo-Juncetum effusi*, to which the habitat aspects detected refer, frames hygrophilous grasslands, characterised by thermophilous hygrophilous species and the dominance of *Juncus effusus*, mainly localised on silty-clayey soils of the mountain belt, periodically subjected to submersion (Brullo et al. 2001). The presence of marsh habitats within beech forests contributes to increase the mountain range's biodiversity levels, which is densely covered by woodland.

#54. Annex I Habitat: 6510 Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) (Bonini F, Ferri V, Gigante D)

EUNIS Classification system: R22 (formerly: E2.2) Low and medium altitude hay meadows (Chytrý et al. 2020)
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Salvio pratensis-Dactylidion glomeratae* Ubaldi et al. in Ubaldi 2003 (Syn: *Ranunculo neapolitani-Arrhenatherion elatioris* Allegrezza et Biondi 2011), *Arrhenatheretalia elatioris* Tx. 1931, *Molinio-Arrhenatheretea* Tx. 1937 (Mucina et al. 2016)
Geographic information: Italy, Umbria, Perugia, Sant'Anatolia di Narco, dintorni del Laghetto di Gavelli, 1129 m a.s.l., Coordinates: 42.680447 N, 12.911167 E (Tab. 11, Rel. 1); 1124 m a.s.l., Coordinates: 42.681955 N, 12.911021 E (Tab. 11, Rel. 2); 1125 m a.s.l., Coordinates: 42.682135 N, 12.910947 E (Tab. 11, Rel. 3); 1128 m a.s.l., Coordinates: 42.680246 N, 12.909240 E (Tab. 11, Rel. 4).
Cells ID in the EEA reference grid: 10kmE456N217 (Fig. 12).
Natura 2000 Site Code: SAC IT5210068 "Laghetto e Piano di Gavelli (Monte Coscerno)".
Phytosociological table: Tab. 11; nomenclature and taxa delimitation according to Portal to the Flora of Italy (2022).
Notes: The habitat occurrence within the SAC IT5210068 is limited to small but valuable surfaces (Fig. 13). A significative expansion of *Asphodelus macrocarpus* Parl. and *Pteridium aquilinum* (L.) Kuhn has been detected in areas adjacent to the reported stands, testifying the threat to the conservation of this habitat type due to the abandonment of traditional management activities (mowing). The finding occurred during the activities of the Life Integrated project LIFE19 IPE/IT/000015 "LIFE IMAGINE Umbria - Integrated MAnagement and Grant Investments for the N2000 NEtwork in Umbria".

Figure 11. Distribution in Italy of Habitat 6420: in black the new cells, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019).

Table 10. Habitat 6420.

Relevé number	1	2	3	
Cell ID	10kmE486N173	10kmE486N174	10kmE486N175	
Latitude	38.510383	38.511694	38.510861	
Longitude	16.258294	16.258992	16.258442	
Date	21/07/05	04/06/16	21/07/05	
Area (m^2)	20	50	20	
Altitude (m a.s.l.)	1148	1142	1146	
Herb layer height (m)	1	1	1	
Herb layer cover (%)	100	100	100	Presences
Charact. of *Dactylorhizo-Juncetum effusi*				
Juncus effusus L. subsp. *effusus*	3	4	5	3
Charact. of *Dactylorhizo-Juncion striati, Holoschoenetalia vulgaris, Molinio-Arrhenatheretea*				
Dactylorhiza maculata (L.) Soó subsp. *saccifera* (Brongn.) Diklić	1	1	1	3
^*Hypericum tetrapterum* Fr.	2	3	2	3
Juncus articulatus L. subsp. *articulatus*	+	2	+	3
Cirsium creticum (Lam.) d'Urv. subsp. *triumfettii* (Lacaita) K. Werner	1	-	2	2
^*Prunella vulgaris* L. subsp. *vulgaris*	1	-	1	2
^*Epipactis palustris* (L.) Crantz	.	3	.	1
Carex leporina L.	+	.	.	1
Potentilla erecta (L.) Raeusch.	1	.	.	1
Other species				
Mentha aquatica L. subsp. *aquatica*	2	1	2	3
Lysimachia nemorum L.	+	1	+	3
Epilobium palustre L.	2	1	1	3
Carex echinata Murray	1	2	.	2
Equisetum palustre L.	2	.	1	2
Holcus mollis L. subsp. *mollis*	3	.	3	2
Geranium versicolor L.	1	.	.	1
Carex distans L.	.	3	.	1
Chaerophyllum hirsutum L.	.	.	1	1
Galium palustre L. subsp. *elongatum* (C.Presl) Arcang.	.	.	1	1
Lycopus europaeus L.	.	.	1	1
Potamogeton polygonifolius Pourr.	.	2	.	1

^ Reference plant species of the Habitat 6420, from Biondi et al. (2009).

Figure 12. Distribution in Italy of Habitat 6510: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019), in white (black outline) the cells later reported (Gigante at al. 2019a).

Table 11. Habitat 6510.

Relevé number	1	2	3	4	
Cell ID	10kmE456N217	10kmE456N218	10kmE456N219	10kmE456N220	
Latitude	42.680447	42.681955	42.682135	42.680246	
Longitude	12.911167	12.911021	12.910947	12.909240	
Date	03/06/21	06/06/22	06/06/22	06/06/22	
Area (m^2)	16	16	16	16	
Altitude (m a.s.l.)	1129	1124	1125	1128	
Exposition (°)	335	-	-	-	
Slope (°)	2	0	0	0	
Cover (%)	98	85	90	90	Presences
Charact. and diff. taxa of *Salvio pratensis-Dactylidion glomeratae* (Syn: *Ranunculo neapolitani-Arrhenatherion elatioris*)					
^*Arrhenatherum elatius* (L.) P.Beauv. ex J.Presl & C.Presl	3	2b	3	3	4
^*Dactylis glomerata* L.	1	2a	2a	2b	4
Ranunculus neapolitanus Ten.	1	+	+	1	4
^*Salvia pratensis* L.	+	.	1	2a	3
Ranunculus velutinus Ten.	.	+	r	2a	3
Campanula rapunculus L.	r	r	r	.	3
Charact. and diff. taxa of *Arrhenatheretalia elatioris, Molinio-Arrhenatheretea*					
^*Cynosurus cristatus* L.	2b	1	2b	1	4
^*Trifolium pratense* L.	1	2a	+	2a	4
^*Lotus corniculatus* L.	+	2b	+	+	4
^*Leucanthemum vulgare* (Vaill.) Lam. subsp. *vulgare*	1	1	+	+	4
Rhinanthus minor L.	r	r	+	+	4
^*Lolium perenne* L.	1	.	2a	1	3
^*Tragopogon pratensis* L.	1	1	.	1	3
^*Poa pratensis* L. subsp. *pratensis*	.	1	1	1	3
^*Achillea millefolium* L.	1	.	1	+	3
^*Trisetaria flavescens* (L.) Baumg. subsp. *flavescens*	.	+	1	+	3
^*Lathyrus pratensis* L.	.	.	+	2b	2
^*Daucus carota* L.	+	1	.	.	2
^*Rumex acetosa* L. subsp. *acetosa*	+	.	r	.	2
^*Plantago lanceolata* L.	r	.	+	.	2
^*Leontodon hispidus* L.	.	+	.	+	2
^*Poa trivialis* L.	.	.	.	1	1
Potentilla reptans L.	.	1	.	.	1
Colchicum lusitanum Brot.	.	r	.	.	1
Galega officinalis L.	r	.	.	.	1
^*Trifolium repens* L.	.	.	+	.	1
Carex distans L.	.	.	r	.	1
Other species					
Festuca stricta Host subsp. *trachyphylla* (Hack.) Patzke ex Pils	2b	2b	2a	2a	4
Medicago lupulina L.	1	+	+	r	4
Cerastium ligusticum Viv.	r	+	+	+	4
Veronica arvensis L.	r	r	r	r	4
^*Taraxacum* sect. *Taraxacum*	+	r	+	+	4
Trifolium incarnatum L. subsp. *molinerii* (Balb. ex Hornem.) Ces.	3	r	r	.	3
Festuca rubra L. subsp. *microphylla* St.-Yves	.	2a	1	1	3
^*Bromus hordeaceus* L.	.	1	1	1	3
^*Centaurea jacea* L. subsp. *gaudinii* (Boiss. & Reut.) Gremli	.	+	+	1	3
^*Anthoxanthum odoratum* L.	2a	.	1	.	2
Medicago sativa L.	r	+	.	.	2
Myosotis arvensis (L.) Hill subsp. *arvensis*	r	r	.	.	2
Ornithogalum etruscum Parl.	r	+	.	.	2
Vicia sativa L.	+	r	.	.	2
Potentilla pedata Willd. ex Hornem.	.	1	.	r	2
Lepidium campestre (L.) W.T.Aiton	.	r	.	r	2
Geranium dissectum L.	.	+	r	.	2
Poterium sanguisorba L. subsp. *balearicum* (Bourg. ex Nyman) Stace	.	r	+	.	2
Arenaria leptoclados (Rchb.) Guss. subsp. *leptoclados*	.	.	.	r	1
Campanula rapunculoides L. subsp. *rapunculoides*	r	.	.	.	1
Cichorium intybus L.	+	.	.	.	1
Convolvulus arvensis L.	.	.	+	.	1
Elymus repens (L.) Gould subsp. repens	.	.	.	+	1
Ervilia hirsuta (L.) Opiz	.	r	.	.	1
Geranium columbinum L.	r	.	.	.	1
Geranium molle L.	r	.	.	.	1
^*Picris hieracioides* L.	+	.	.	.	1
Potentilla detommasii Ten.	.	.	r	.	1
Ranunculus millefoliatus Vahl	.	.	.	r	1
Rumex acetosella L.	r	.	.	.	1
Scorzonera laciniata L. subsp. *laciniata*	.	+	.	.	1
Scorzoneroides cichoriacea (Ten.) Greuter	.	.	.	1	1

Table 11. Continuation.

Relevé number	1	2	3	4	
Cell ID	10kmE456N217	10kmE456N218	10kmE456N219	10kmE456N220	
Latitude	42.680447	42.681955	42.682135	42.680246	
Longitude	12.911167	12.911021	12.910947	12.909240	
Date	03/06/21	06/06/22	06/06/22	06/06/22	
Area (m^2)	16	16	16	16	
Altitude (m a.s.l.)	1129	1124	1125	1128	
Exposition (°)	335	-	-	-	
Slope (°)	2	0	0	0	
Cover (%)	98	85	90	90	Presences
Sherardia arvensis L.	.	.	r	.	1
Silene latifolia Poir.	r	.	.	.	1
Trifolium campestre Schreb.	.	+	.	.	1
Trifolium striatum L.	.	.	r	.	1
Valerianella sp.	+	.	.	.	1

^ Reference plant species of the Habitat 6510, from Biondi et al. (2009).

Figure 13. Habitat 6510 in the reported stand (around of Gavelli small lake, Sant'Anatolia di Narco, Perugia, Italy).

#55. Annex I Habitat: 91AA* Eastern white oak woods (Mantino F, Forte L, Tomaselli V)

EUNIS Classification system: T19 (formerly: G1.7a) Temperate and submediterranean thermophilous deciduous forest (Chytrý et al. 2020).
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: F*raxino orni-Quercenion ilicis* Bacchetta, Bagella, Biondi, Farris, Filigheddu et Mossa ex Bacchetta, Bagella, Biondi, Farris, Filigheddu et Mossa in Biondi et al. 2013; *Fraxino orni-Quercion ilicis* Biondi, Casavecchia et Gigante ex Biondi, Casavecchia et Gigante in Biondi, Allegrezza, Casavecchia, Galdenzi, Gigante et Pesaresi 2013; *Quercetalia ilicis* Br.-Bl. ex Molinier 1934; *Quercetea ilicis* Br.-Bl. in Br.-Bl., Roussine et Nègre 1952 (Biondi and Blasi 2015).
Geographic information: Italy, Apulia, San Vincenzo, Monopoli (Bari), 200 m a.s.l. Coordinates: 40.925802 N, 17.231979 E (Tab. 12, Rel. 1); Pozzo Cucù, Polignano a Mare (Bari), 280 m a.s.l. Coordinates: 40.904542 N, 17.171749 E and 40.907777 N, 17.168341 E (Tab. 12, Rels. 2 and 3); Caramanna, Monopoli (Bari), 190 m a.s.l. Coordinates: 40.926039 N, 17.245225 E (Tab. 12, Rel. 4).

Cells ID in the EEA reference grid: 10kmE492N200 (Tab. 12, Rel. 1), 10kmE493N200 (Tab. 12, Rels 2 and 3) and 10kmE493N201 (Tab. 12, Rel. 3) (Fig. 14).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Tab. 12; nomenclature and taxa delimitation according to Portal to the Flora of Italy (2022).
Notes: This priority habitat is distributed in Apulia Region on the Gargano promontory, in the inland areas of Monti Dauni and Murgia, and in a limited portion of the Brindisi province (Eionet 2019). The forest communities investigated are located in the province of Bari, in the inland areas occurring between Monopoli and Polignano a Mare, and represent fragments of woods inserted in a rural context, in private areas between the houses. These woods are dominated by *Quercus pubescens* Willd. and are characterized by rich evergreen species component in the undergrowth. We have opted to classify these forests in the *Quercetea ilicis* Br.-Bl. in Br.-Bl., Roussine et Nègre 1952, similarly to what was proposed by other authors for other pubescent oak forest communities in Sicily, Sardinia, and Calabria (Brullo et al. 2001; Bacchetta et al. 2004; Brullo et al. 2008). However, the debate on the syntaxonomic placing of the xerothermic woods of *Quercus pubescens* is still open. In fact, other authors consider the Mediterranean woods of *Quercus pubescens* rich in evergreen species of central and southern Italy as belonging

Table 12. Habitat 91AA*.

Relevé number	1	2	3	4	
Cell ID	10kmE493N200	10kmE492N200	10kmE492N200	10kmE493N201	
Latitude	40.925802	40.904542	40.907777	40.926.039	
Longitude	17.231979	17.171749	17.168341	17.245225	
Date	27/05/22	27/05/22	27/05/22	27/05/22	
Area (m^2)	100	100	100	100	
Altitude (m a.s.l.)	200	280	280	190	
Cover (%)	100	100	100	100	
Tree layer cover (%)	90	90	85	90	
Shrub layer cover (%)	70	20	70	60	
Herb layer cover (%)	30	5	35	20	
Tree layer height (m)	7	5	6	7	
Shrub layer height (m)	1.5	0.9	1.7	1.3	
Herb layer height (m)	0.5	0.2	0.5	0.4	Presences
^*Quercus pubescens* Willd.	5	5	4	5	4
Charact. taxa of *Fraxino orni-Quercenion ilicis*					
Dioscorea communis (L.) Caddick & Wilkin	1	+	1	+	4
Cyclamen hederifolium Aiton	+	+	+	+	4
Charact. and diff. taxa of *Fraxino orni-Quercion ilicis, Quercetalia ilicis, Quercetea ilicis*					
Phillyrea latifolia L.	+	2	3	2	4
^*Asparagus acutifolius* L.	+	+	+	+	4
^*Rubia peregrina* L.	+	+	+	+	4
Viburnum tinus L. subsp. *tinus*	+	.	1	+	3
Quercus ilex L.	+	.	1	+	3
Laurus nobilis L.	+	.	+	+	3
^*Smilax aspera* L.	.	.	1	+	2
Arbutus unedo L.	.	.	1	.	1
Cytisus infestus (C. Presl) Guss.	.	.	+	.	1
Taxa of *Pistacio lentisci-Rhamnetalia alaterni*					
Pistacia lentiscus L.	4	+	1	2	4
Rhamnus alaternus L. subsp. *alaternus*	1	.	2	1	3
Other species					
^*Hedera helix* L. subsp. *helix*	+	+	+	+	4
^*Rosa sempervirens* L.	+	+	+	+	4
^*Crataegus monogyna* Jacq.	1	+	+	.	3
Brachypodium sylvaticum (Huds.) P. Beauv.	1	.	+	+	3
Clematis vitalba L.	1	.	.	+	2
Osyris alba L.	.	+	+	.	2
Rubus ulmifolius Schott	1	.	.	+	2
Prunus spinosa L. subsp. *spinosa*	+	+	.	.	2
Allium subhirsutum L. subsp. *subhirsutum*	+	.	+	+	2
Achnatherum bromoides (L.) P. Beauv.	+	.	+	.	2
Carex depauperata Curtis ex With.	+	.	+	.	2
Carex distachya Desf.	+	.	+	.	2
Melica uniflora Retz.	+	.	+	.	2
Sorbus domestica L.	+	.	.	.	1
Lonicera implexa Aiton subsp. *implexa*	.	.	+	.	1
Prunus mahaleb L.	+	.	.	.	1
Aegonychon purpurocaeruleum (L.) Holub	.	+	.	.	1

^ Reference plant species of the Habitat 91AA*, from Biondi et al. (2009).

to the classes *Quercetea pubescentis* or *Querco-Fagetea* (Di Pietro and Blasi 1998; Biondi et al. 2004; Blasi et al. 2004; Ubaldi 2003).
The main threats affecting these sites are the effects of human activities (e.g., urbanization, fire, agriculture) and the extreme fragmentation.

#56. Annex I Habitat: 91E0* Alluvial forests with Alnus glutinosa and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) (Patera G)

EUNIS Classification system: G1.131 - Southern *Alnus glutinosa* galleries
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Angelico sylvestris-Alnetum glutinosae* Brullo et Spampinato 1997, *Alnetum glutinoso-cordatae* Brullo et Spampinato 1997, *Populion albae* Br.-Bl. ex Tchou 1948, *Populetalia albae* Br.-Bl. ex Tchou 1948, *Salici purpureae-Populetea nigrae* (Rivas-Mart. et Cantó ex Rivas-Mart. et al. 1991) Rivas-Mart. et Cantó 2002 (Biondi and Blasi 2015).
Geographic information: Italy, Campania, Salerno, Caselle in Pittari, 287 m a.s.l., Coordinates: 40.186791 N, 15.555581 E (Tab. 13, Rel. 1); Castel San Lorenzo, 117 m a.s.l., Coordinates: 40.425153 N, 15.240472 E (Tab. 13, Rel. 2); Laurino, 298 m a.s.l., Coordinates: 40.344312 N, 15.276142 E (Tab. 13, Rel. 3); Castelnuovo Cilento, 16 m a.s.l., Coordinates: 40.190665 N, 15.172522 E (Tab. 13, Rel. 4); Stio, 471 m a.s.l., Coordinates: 40.314957 N, 15.234722 E (Tab. 13, Rel. 5); Sacco, 307 m a.s.l., Coordinates: 40.387160 N, 15.360478 E (Tab. 13, Rel. 6); Felitto, 195 m a.s.l., Coordinates: 40.365201 N, 15.250643 E (Tab. 13, Rel .7); Laurino, 435 m a.s.l., Coordinates: 40.247591 N, 15.411649 E (Tab. 13, Rel. 8).
Cells ID in the EEA reference grid: All the relevés are referring to Tab. 13, 10kmE479N191 (Rel. 1), 10kmE476N194 (Rel. 2), 10kmE477N193 (Rels 3 and 6), 10kmE476N191 (Rel. 4), 10kmE476N192 (Rel. 5), 10kmE476N193 (Rel. 7), 10kmE478N192 (Rel. 8) (Fig. 15).
Natura 2000 Site Code: All the relevés are referring to Tab. 13, ZSC IT8050001"Alta Valle del Fiume Bussento" (Rel. 1), ZSC IT8050002"Alta Valle del Fiume Calore Lucano Salernitano" (Rels 2, 3, 6, 7), ZSC IT8050012 "Fiume Alento" (Rels 4 and 5), ZSC IT8050013 "Fiume Mingardo" (Rel. 8).
Phytosociological table: Tab. 13; nomenclature and taxa delimitation according to Portal to the Flora of Italy (2022).
Notes: The community detected are referred to *Angelico sylvestris-Alnetum glutinosae* (Rels from 1 to 4) and *Alnetum glutinoso-cordatae* (Brullo and Spampinato 1997) (Rels from 5 to 8). The first community is represented by riparian woods with *Alnus glutinosa*, developed in wide valleys occurring from the sea level up to 500-600 m of elevation on periodically flooded soils rich in silt and clay. The second community is a sort of ravine forest characterized by the co-dominance of *Alnus cordata* and it is found along rivers and streams located in steep-narrow valleys at altitudes between 50 and 1450 m (Corbetta et al. 2004). Both communities develop in conditions of

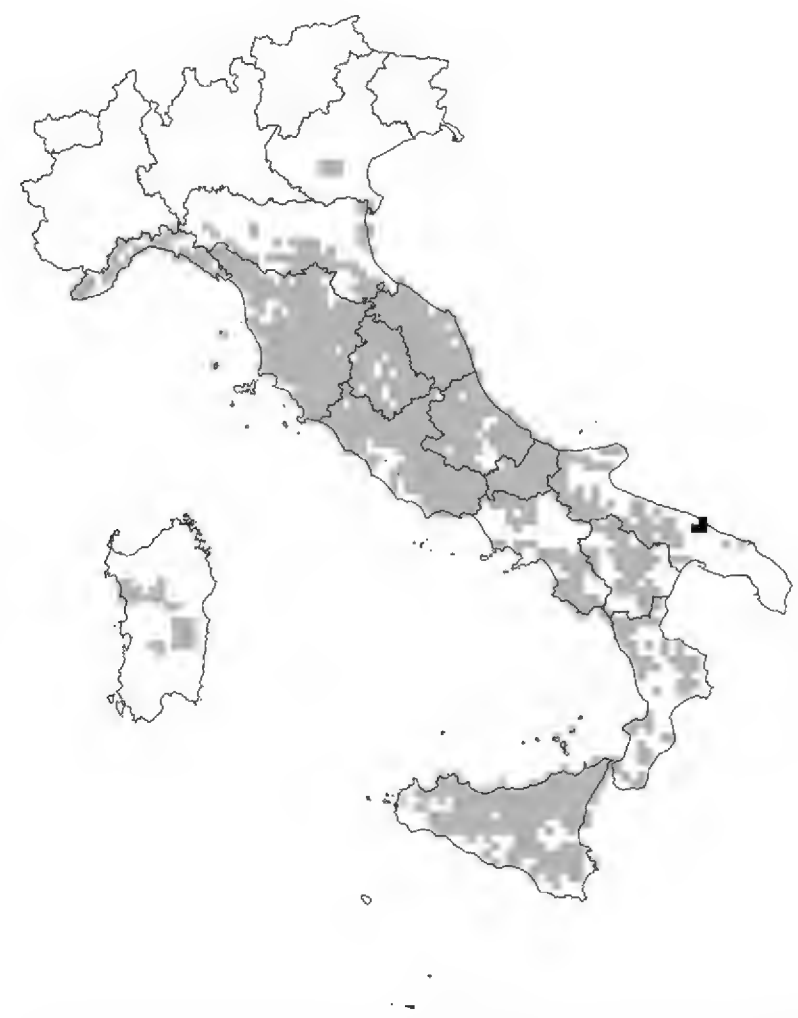

Figure 14. Distribution in Italy of Habitat 91AA*: in black the new cells, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019).

Table 13. Habitat 91E0*.

Relevé number	1	2	3	4	5	6	7	8	
Cell ID	10km E479N191	10km E476N194	10km E477N193	10km E476N191	10km E476N192	10km E477N193	10km E476N193	10km E478N192	
Latitude	40.186791	40.425153	40.344312	40.190665	40.314957	40.387160	40.365201	40.247591	
Longitude	15.555581	15.240472	15.276142	15.172522	15.234722	15.360478	15.250643	15.411649	
Date	16/06/22	27/06/22	29/06/22	30/06/22	12/05/22	28/06/2022	29/06/2022	10/05/22	
Area (m^2)	100	100	100	80	100	100	80	100	
Altitude (m a.s.l.)	287	117	298	16	471	307	195	435	
Exposition	SE	N	NW	NE	N	NW	SE	NE	
Slope (°)	15	10	15	5	30	30	40	5	
Cover (%)	100	100	90	100	70	80	100	90	Presences
Diagnostic taxa of *Angelico sylvestris-Alnetum glutinosae*									
^*Angelica sylvestris* L.	1	1	1	2	.	.	.	.	4
Diagnostic taxa of *Alnetum glutionoso-cordatae*									
^*Alnus cordata* (Loisel.) Duby	.	.	.	.	3	4	3	1	4
Charact. taxa of *Populion* and *Populetalia albae*									
^*Alnus glutinosa* (L.) Gaertn.	5	4	4	5	1	2	4	4	8
^*Petasites hybridus* (L.) G.Gaertn., B.Mey. & Scherb.	1	1	2	1	1	1	2	2	8
^*Carex pendula* Huds.	1	.	1	1	1	.	1	1	6
^*Equisetum telmateia* Ehrh.	+	1	+	.	.	1	1	.	5
Vinca major L.	+	+	.	.	1	.	1	1	5
Hypericum hircinum L. subsp. *majus* (Aiton) N.Robson	.	1	1	.	.	.	+	.	3
^*Ulmus minor* Mill.	.	1	.	.	.	1	1	.	3
^*Rubus caesius* L.	.	.	1	.	1	.	.	1	3
^*Sambucus nigra* L.	.	.	+	1	.	.	.	.	2
^*Populus nigra* L.	.	+	.	+	.	.	.	.	2
Ficus carica L.	.	1	.	.	.	.	r	.	2
Salix alba L.	.	.	1	.	.	.	.	.	1
^*Solanum dulcamara* L.	.	.	.	1	.	.	.	.	1
^*Humulus lupulus* L.	.	.	.	1	.	.	.	.	1
Platanus orientalis L.	.	.	.	1	.	.	.	.	1
Bryonia dioica Jacq.	.	.	.	.	1	.	.	.	1
Charact. taxa of *Salici purpureae-Populetea nigrae*									
Salix purpurea L.	1	1	.	.	.	.	.	.	2
Salix eleagnos Scop.	.	+	.	.	.	2	.	.	2
Vitis vinifera L.	.	.	.	+	.	.	.	.	1
Other species									
Brachypodium sylvaticum (Huds.) P.Beauv.	1	1	2	.	1	1	2	1	7
Clematis vitalba L.	.	1	1	1	1	1	.	1	6
Cornus sanguinea L.	1	1	1	.	.	1	1	1	6
^*Hedera helix* L.	.	1	.	.	1	1	1	.	4
Crataegus monogyna Jacq.	.	.	r	.	.	.	1	1	3
^*Acer campestre* L.	.	.	1	.	.	.	1	.	2
Convolvulus sylvaticus Kit.	.	.		+	1	.	.	.	2
Corylus avellana L.	.	.	1	.	.	.	.	1	2
Cyperus longus L.	1	1	.	.	.	.	.	.	2
Fontinalis antipyretica Hedw.	.	.	1	.	.	.	1	.	2
Mentha aquatica L.	+	.	.	+	.	.	.	.	2
Ranunculus lanuginosus L.	.	.	.	.	+	.	.	1	2
Robinia pseudacacia L.	.	.	r	.	.	1	.	.	2
Rosa sempervirens L.	.	+	r	.	.	.	.	.	2
Rubus ulmifolius Schott	.	.	.	2	.	1	.	.	2
Acer cappadocicum Gled. subsp. *lobelii* (Ten.) A.E.Murray	+	.	.	.	.	.	.	.	1
Acer opalus Mill. subsp. *obtusatum* (Waldst. & Kit. ex Willd.) Gams	.	.	r	.	.	.	.	.	1
Agrostis stolonifera L.	.	.	.	+	.	.	.	.	1
Carpinus betulus L.	.	.	r	.	.	.	.	.	1
Epilobium hirsutum L.	.	.	.	r	.	.	.	.	1
Geranium nodosum L.	r	.	.	.	.	.	.	.	1
Helosciadium nodiflorum (L.) W.D.J.Koch	.	.	.	1	.	.	.	.	1
Rubus hirtus Waldst. & Kit.	.	1	.	.	.	.	.	.	1
Sparganium erectum L.	.	.	.	r	.	.	.	.	1
^*Stachys sylvatica* L.	.	.	1	.	.	.	.	.	1
^*Urtica dioica* L.	.	.	.	1	.	.	.	.	1
Fraxinus ornus L.	.	.	.	.	.	.	.	1	1

Table 13. Continuation.

Relevé number	1	2	3	4	5	6	7	8	
Cell ID	10km E479N191	10km E476N194	10km E477N193	10km E476N191	10km E476N192	10km E477N193	10km E476N193	10km E478N192	
Latitude	40.186791	40.425153	40.344312	40.190665	40.314957	40.387160	40.365201	40.247591	
Longitude	15.555581	15.240472	15.276142	15.172522	15.234722	15.360478	15.250643	15.411649	
Date	16/06/22	27/06/22	29/06/22	30/06/22	12/05/22	28/06/2022	29/06/2022	10/05/22	
Area (m^2)	100	100	100	80	100	100	80	100	
Altitude (m a.s.l.)	287	117	298	16	471	307	195	435	
Exposition	SE	N	NW	NE	N	NW	SE	NE	
Slope (°)	15	10	15	5	30	30	40	5	
Cover (%)	100	100	90	100	70	80	100	90	Presences
Geranium purpureum Vill.	.	.	.	.	1	.	.	.	1
Lamium flexuosum Ten.	.	.	.	.	1	.	.	.	1
Sanicula europaea L.	.	.	.	.	.	.	.	1	1
Scirpoides holoschoenus (L.) Soják	.	.	.	.	.	1	.	.	1
Tilia platyphyllos Scop.	.	.	.	.	.	.	1	.	1
Allium ursinum L.	.	.	.	.	.	.	.	1	1
Dioscorea communis (L.) Caddick & Wilkin	.	.	.	.	.	.	.	+	1
Cardamine impatiens L.	.	.	.	.	r	.	.	.	1

^ Reference plant species of the Habitat 91E0*, from Biondi et al. (2009).

Figure 15. Distribution in Italy of Habitat 91E0*: in black the new cells, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019), in white (black outline) the cells later reported (Bazan et al. 2021).

high soil moisture, with thermotypes ranging from thermo-Mediterranean to meso-Mediterranean. These are the first reported sites of occurrence of this priority habitat for Campania Region in the area of the Cilento, Vallo di Diano and Alburni National Park (Fig. 16). The recorded communities, which were both already described for Calabria Region, are located at the northern limit of distribution of the respective associations. Strict compliance with the European Habitat Interpretation Manual EUR28 would not allow the inclusion of some of the forest communities here identified and reported. In fact, Habitat 91E0* was originally described as closely linked to boreal or central European communities. On the other hand, the Mediterranean variants of this Habitat introduced in the Italian manual of interpretation make it possible to also include ravine forests dominated by *Alnus cordata*. It is evident that a critical review is necessary to understand what level of "Mediterranean contamination" is admissible to still be admitted in 91E0*.

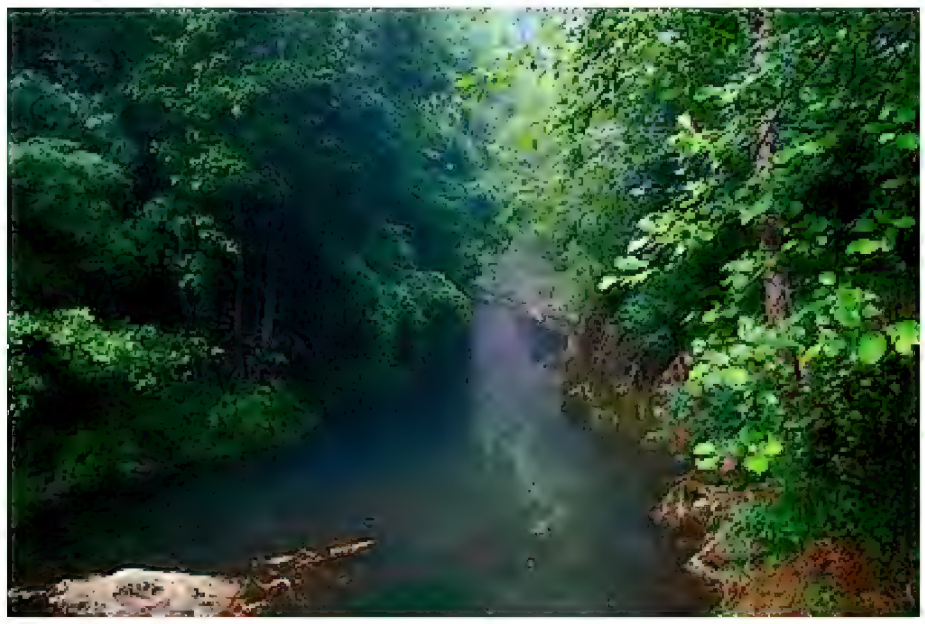

Figure 16. Habitat 91E0* in the "Cilento, Vallo di Diano e Alburni" National Park (Campania, Italy).

#57. Annex I Habitat: 91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) (Mei G, Stinca A, Esposito A)

EUNIS Classification system: G1.131 - Southern *Alnus glutinosa* galleries
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Populion albae* Br.-Bl. ex Tchou 1948, *Populetalia albae* Br.-Bl. ex Tchou 1948, *Salici purpureae-Populetea nigrae* Rivas-Martínez et Cantó ex Rivas-Martínez, Báscones, T.E. Díaz, Fernández-González et Loidi 2001 (Biondi and Blasi 2015).
Geographic information: Italy, Toscana, Firenze, Barberino Tavernelle, Borro Argennino, 305 m a.s.l. Coordinates: 43.531232 N, 11.255291 E (Tab. 14, Rel. 1); 297 m a.s.l. Coordinates: 43.533249 N, 11.258214 E (Tab. 14, Rel. 2); 283 m a.s.l. Coordinates: 43.537742 N, 11.265783 E (Tab. 14, Rel. 3).
Cells ID in the EEA reference grid: 10kmE442N227 (Fig. 15).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Tab. 14; nomenclature and taxa delimitation according to Portal to the Flora of Italy (2022).
Notes: The relevés describe the riparian forests of *Alnus glutinosa* and *Populus nigra* subsp. *nigra* which occur along the watercourses in the hilly stretches and in the areas with water stagnation linked to the fluvial dynamics of the Chianti hilly complex. The formations described develop on alluvial soils sometimes flooded in the winter, in which however there are particular conditions of edaphic humidity due to the perennial presence of water already a few decimetres from the surface. Given the ecological importance of these environments and considering the scarce information about the dynamics of expansion and regression of these community in the hilly area linked to the abandonment and climate change, it would be particularly interesting a monitoring study of these formations such as the one carried out in similar environments in Croatia (Vukelić et al. 2019).

#58. Annex I Habitat: 91F0 Riparian mixed forests of *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior* or *Fraxinus angustifolia*, along the great rivers (Tavilla G, Laface VLA, Spampinato G, Musarella CM, Crisafulli A, Maiorca G)

EUNIS Classification system: G1.3 Mediterranean riparian woodland
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Aro italici-Ulmetum minoris* Rivas-Martínez ex Lòpez 1976, *Populion albae* Br-Bl. ex Tchou 1948, *Populetalia albae* Br.-Bl. ex Tchou 1948, *Salici purpureae-Populetea nigrae* (Riv-Mart. et Cantó ex Riv-Mart., Báscones, T.E. Díaz, Fernández-Gonzáles et Loidi) Riv.-Mart., Fernández-Gonzáles, Loidi, Lousa et Penas 2001 (Maiorca et al. 2007).
Geographic information: Italy, Calabria, Foce del Fiume Crati, C.da La Foggia, 6 m a.s.l., Coordinates: 39.708448 N, 16.522037 E [Tab. 26, Rel. 1 in Maiorca et al. (2007)]; Italy, Calabria, Foce del Fiume Crati, sinistra idrografica, sulla scarpata dell'argine (carraia), 4 m a.s.l., Coordinates: 39.714461 N, 16.520507 E [Tab. 26, Rel. 2 in Maiorca et al. (2007)].
Cells ID in the EEA reference grid: 10kmE488N187 (Fig. 17).
Natura 2000 Site Code: SAC IT9310044 "Foce del Fiume Crati" [Tab. 26 in Maiorca et al. (2007)].
Phytosociological table: Tab. 26 in Maiorca et al. (2007); taxonomic nomenclature according to Conti et al. (2005).
Notes: Sub-Mediterranean hygrophilous vegetation occurs in floodplains and along rivers where the flooding regime is very short. Along the estuary of the river Crati in Calabria (Southern Italy), this habitat is characterized by riparian woodlands belonging to the alliance *Populion albae*, which includes the association *Aro italici-Ulmetum minoris* Rivas-Martínez ex López 1976 and other hygrophilous associations such as *Roso sempervirentis-Populetum nigrae* Pedrotti et Gafta 1992, *Angelico sylvestris-Alnetum glutinosae* Brullo et Spampinato 1997, *Angelico sylvestris-Alnetum glutinosae iridetosum pseudacori* Brullo et Spampinato 1997 and the alliance *Alno-Quercion roboris* Horvat 1950 with the association *Clematido scandentis-Populetum albae* (Brullo et Spampinato 1997) Maiorca et al. nom. corr., characterised by the endemic species *Clematis rigoi* W.T Wang (= *Clematis viticella* L. subsp. *scandens* Arcang.) (Tab. 25-26 in Maiorca et al. (2007). Our new record is based on the previous study carried out by Maiorca et al. (2007).

Table 14. Habitat 91E0*.

Revelée number	1	2	3	
Cell ID	10kmE442N227	10kmE442N227	10kmE442N227	
Latitude	43.531232	43.533249	43.537742	
Longitude	11.255291	11.258214	11.265783	
Date	23/08/22	24/08/22	24/08/22	
Area (m^2)	200	180	180	
Altitude (m a.s.l.)	305	297	283	
Exposition	NNW	NW	NW	
Slope (°)	5	4	6	
Tree layer height (m)	18	15	15	
Shrub layer height (m)	3	3	3	
Herb layer height (m)	0.5	0.1	0.1	
Cover (%)	100	100	100	
Tree layer cover (%)	80	95	85	
Shrub layer cover (%)	35	15	15	
Herb layer cover (%)	30	10	15	Presences
Charact. and diff. taxa of *Populion albae*				
^*Alnus glutinosa* (L.) Gaertn.	3	4	3	3
^*Populus nigra* L. subsp. *nigra*	2b	2a	2a	3
^*Sambucus nigra* L.	2a	.	1	2
^*Ulmus minor* Mill. subsp. *minor*	1	.	.	1
^*Rubus caesius* L.	r	.	.	1
Charact. and diff. taxa of *Populetalia albae*				
^*Solanum dulcamara* L.	r	r	+	3
Charact. and diff. taxa of *Salici-purpureae-Populetea nigrae*				
^*Carex remota* L.	.	r	r	2
Rubia peregrina L.	1	.	.	1
Crataegus monogyna Jacq.	1	.	.	1
Clematis vitalba L.	2a	2a	2a	3
^*Carex pendula* Huds.	2b	2a	1	3
Other species				
Corylus avellana L.	2a	3	2a	3
Brachypodium sylvaticum (Huds.) P.Beauv. subsp. *sylvaticum*	2a	1	1	3
^*Hedera helix* L. subsp. *helix*	2a	1	1	3
Fraxinus ornus L. subsp. *ornus*	+	2a	1	3
^*Acer campestre* L.	1	1	1	3
Ligustrum vulgare L.	1	1	1	3
Viola reichenbachiana Jord. ex Boreau	+	2a	+	3
Viola alba Besser subsp. *dehnhardtii* (Ten.) W. Becker	1	1	+	3
Melica uniflora Retz.	+	1	+	3
Primula vulgaris Huds.	r	1	+	3
Eupatorium cannabinum L. subsp. *cannabinum*	1	r	r	3
Ranunculus lanuginosus L.	r	+	r	3
Rubus ulmifolius Schott	2b	r	1	3
Potentilla reptans L.	r	r	+	3
Mentha aquatica L. subsp. *aquatica*	1	r	r	3
^*Equisetum palustre* L.	1	r	r	3
Aegonychon purpurocaeruleum (L.) Holub	2a	.	+	2
Ostrya carpinifolia Scop.	.	2a	1	2
Vitis vinifera L.	.	1	1	2
Orobanche hederae Vaucher ex Duby	.	r	r	2
Daphne laureola L.	.	2a	.	1
Helleborus viridis L.	.	+	.	1
^*Stachys sylvatica* L.	.	r	.	1
Pyracantha coccinea M. Roem.	2a	.	.	1
Epilobium hirsutum L.	1	.	.	1
Asparagus acutifolius L.	1	.	.	1
Hypericum tetrapterum Fr.	1	.	.	1
Lycopus europaeus L.	1	.	.	1
Robinia pseudoacacia L.	1	.	.	1
Ajuga reptans L.	+	.	.	1
Helleborus foetidus L. subsp. *foetidus*	+	.	.	1
Juglans regia L.	+	.	.	1
Taraxacum sect. *Taraxacum* F.H. Wigg.	+	.	.	1
Campanula trachelium L. subsp. *trachelium*	r	.	.	1
Pulicaria dysenterica (L.) Bernh.	r	.	.	1

^ Reference plant species of the Habitat 91E0*, from Biondi et al. (2009).

Figure 17. Distribution in Italy of Habitat 91F0: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019).

#59. Annex I Habitat: 9540 Mediterranean pine forests with endemic Mesogean pines (Gianguzzi L, Bazan G)

EUNIS Classification system: T3A (formerly: G3.7) Mediterranean lowland to submontane pine forest (Chytrý et al. 2020).
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Cisto cretici-Pinetum pineae* Brullo, Minissale, Siracusa, Scelsi et Spampinato 2002, *Pinion pineae* Feinbrun 1959, *Pinetalia halepensis* Biondi, Blasi, Galdenzi, Pesaresi et Vagge, *Pinetea halepensis* Bonari et Chytrý in Bonari et al. 2021 (Bonari et al. 2021; Brullo et al. 2002).
Geographic information: Italy, Sicily, Montemaggiore Belsito, Bosco della Favara (Fig. 19), 755 m a.s.l., Coordinates: 37.817808 N, 13.777869 E (Tab. 15, Rel. 1); Italy, Sicily, Calatafimi, Contrada Bosco Gaggera (Fig. 20), 269 m a.s.l., Coordinates: 37.944113 N, 12.865999 E (Tab. 15, Rel. 2); Italy, Sicily, Calatafimi, Contrada Bosco Gaggera (Fig. 19), 285 m a.s.l., Coordinates: 37.944002 N, 12.866582 E (Tab. 15, Rel. 3).
Cells ID in the EEA reference grid: 10kmE465N164 (Tab. 15, Rel. 1); 10kmE457N165 (Tab. 15, Rels 2 and 3) (Fig. 18).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Tab. 15; nomenclature and taxa delimitation according to Portal to the Flora of Italy (2022).
Notes: This association was described by Brullo et al. (2002) for the steep and south-facing slopes of quartz-arenitic substrates which are widespread on the Nebrodi and Madonie Mountains, as well as in inland areas of Sicily, up to the Trapani Mountains (Gianguzzi et al. 2015).

The new 9540 habitat sites are distributed on different types of sandy soils that in turns developed on different lithological substrates. Bosco della Favara site (Montemaggiore Belsito, Palermo province) is located on the Numidian flysch, while "Bosco della Gaggera" site (Calatafimi, province of Trapani) is located on the so-called Terravecchia formations, in the thermo-mesomediterranean sub-humid bioclimatic belt. Both the residual stands of pine forests in issue are to be considered the final successional stage of an edapho-xerophilous series linked to the dry acidophilic substrates (*Cisto creticae-Pino pineae* sigmetum). The pine wood community of Calatafimi belongs to a wider land unit dynamically tending to the potential vegetation of the cork oak climatophilous series (*Genisto aristatae-Querco suberis* sigmetum) this latter being characterized by deeper soils than those characterizing the pine forests (Fig. 19). The community of "Bosco della Favara" (Montemaggiore Belsito), on the other hand, develops on small bumps within slopes, emerging from a milder profile a wide area dominated by forests of pubescent oaks (*Erico arboreae-Querco virgilianae* sigmetum; Fig. 20) whose taxonomic identity is currently under critical review (Di Pietro et al. 2020; 2021). The new habitat here presented are a part of a well-preserved land mosaic typical of the Sicilian countryside, that still maintains a high level of floristic and coenological diversity despite a long-term exploitation (Bazan et al. 2020; Castrorao Barba et al. 2021; Bazan and Castrorao Barba 2022).

Table 15. Habitat 9540.

Relevé number	1	2	3	
Cell ID	10kmE465N164	10kmE457N165	10kmE457N165	
Latitude	37.817808	37.944113	37.944002	
Longitude	13.777869	12.865999	12.866582	
Date	13/03/18	19/11/16	10/11/16	
Area (m^2)	100	300	350	
Altitude (m a.s.l.)	755	269	285	
Exposition	NW	W	W	
Slope (°)	10	20	26	
Tree layer height (m)	18	18	18	
Shrub layer height (m)	1.5	1.3	1.5	
Herb layer height (m)	0.2	0.7	0.8	
Cover (%)	100	100	100	
Tree layer cover (%)	90	90	90	
Shrub layer cover (%)	80	100	100	
Herb layer cover (%)	70	30	35	Presences
Charact. taxa of *Cisto cretici-Pinetum pineae*				
^*Cistus creticus* L.	2	1	1	3
Eryngium bocconei Lam.	1	1	+	3
Charact. and diff. taxa of *Pinion pineae*				
^*Pinus pinea* L.	5	5	5	3
Transg. *Quercetea ilicis*				
Calicotome infesta Guss.	5	2	2	3
Asparagus acutifolius L.	1	+		
Erica arborea L.	1	5	2	3
Olea europaea L. var. *sylvestris* Hoffm. & Link	.	1	1	2
Ampelodesmos mauritanicus (Poir.) Dur. & Sch.	.	3	3	2
Arbutus unedo L.	.	2	1	2
Phillyrea media L.		1	1	2
Quercus pubescens Willd.	2	.	.	1
Rubia peregrina L.	1	.	.	1
Rosa sempervirens L.	1	.	.	1
Ruscus aculeatus L.	1	.	.	1
Pyrus spinosa Forssk.	1	.	.	1
Arisarum vulgare O.Targ.Tozz.	.	.	1	1
Daphne gnidium L.	.	.	+	1
Other species				
Leontodon tuberosus L.	1	1	1	3
Cistus salvifolius L.	.	3	2	2
Helminthotheca aculeata (Vahl) Lack	.	2	1	2
Genista monspessulana (L.) L.A.S. Johnson	.	1	1	2
Pulicaria odora (L.) Rchb.	.	1	1	2
Cistus creticus L.	.	1	1	2
Brachypodium retusum (Pers.) P. Beauv.	.	1	+	2
Hyparrhenia hirta (L.) Stapf.	.	+	1	2
Lotus tenuis Waldst. & Kit. ex Willd.	.	+	+	2
Spartium junceum L.	2	.	.	1
Crataegus monogyna Jacq.	1	.	.	1
Carlina sicula Ten.	1	.	.	1
Magydaris pastinacea (Lam.) Paol.	1	.	.	1
Rumex thyrsoides Desf.	1	.	.	1
Petrosedum tenuifolium (Sm.) Grulich	1	.	.	1
Hyoseris radiata L.	+	.	.	1
Leontodon siculus (Guss.) Nyman	+	.	.	1
Bellis sylvestris Cirillo	.	.	1	1
Dactylis glomerata L. subsp. *hispanica* (Roth) Nyman	.	.	+	1
Fumana thymifolia (L.) Spach ex Webb	.	.	+	1
Carex flacca Schreb. subsp. *erythrostachys* (Hoppe) Holub	.	.	+	1
Ferula communis L.	.	.	+	1

^ Reference plant species of the Habitat 9540, from Biondi et al. (2009).

Figure 18. Distribution in Italy of Habitat 9540: in black the new cells, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019).

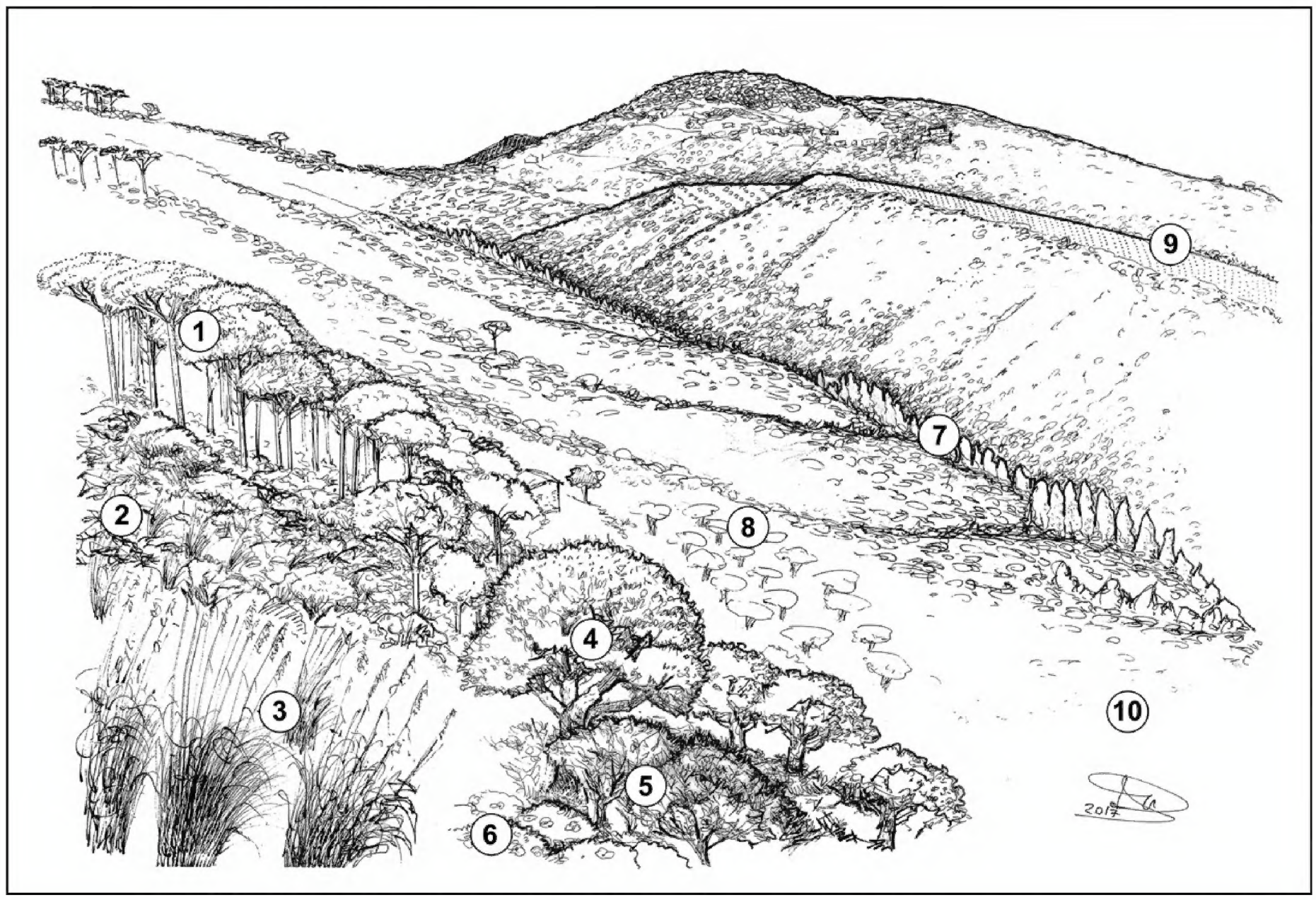

Figure 19. NW slope of Bosco di Calatafimi (Sicily): 1) *Pinus pinea* woodland (*Cisto cretici-Pinetum pineae*); 2) *Arbutus unedo* and *Erica arborea maquis* (*Erico-Arbutetum unedonis*); 3) *Ampelodesmos mauritanicus* grassland (*Helictotricho-Ampelodesmetum mauritanici*); 4) *Quercus suber* woodland (*Genisto-Quercetum suberis pistacietosum terebinthi*); 5) *Calicotome infesta* (*Pyro-Calicotometum infestae*); 6) *Cistus salvifolius* garrigue; 7) Riparian vegetation with *Populus nigra* and *Salix alba* (*Salicetum albo-pedicellatae*); 8) Olive grove; 9) Vineyard.

Figure 20. Habitat 9540, *Cisto cretici-Pinetum pineae* at "Bosco della Favara e Bosco di Granza" Natural Reserve (Sicily, Italy).

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